

WHAT IS CLAIMED IS:

- 1 **1.** A method of using wastewater in the processing of fuels for
2 a high temperature fuel cell, comprising the following
3 steps:
4 a) using as said fuels a liquid hydrocarbon fuel,
5 b) processing said water by one or more steps of
6 filtration, reverse osmosis, and cleaning to produce
7 prepared water,
8 c) emulsifying said liquified hydrocarbon fuel with said
9 prepared water to form an emulsion as fuel for said
10 high temperature fuel cell.

- 1 **2.** The method of claim 1, further comprising a step of
2 cracking said liquid hydrocarbon fuels to convert an
3 initial long hydrocarbon chain bond into a shorter
4 hydrocarbon chain bond, and performing said cracking step
5 as an electrochemical and thermal catalytic step.

- 1 **3.** The method of claim 1, further comprising the step of
2 catalytically withdrawing sulfur and sulfur compounds
3 including hydrogen sulfide from said emulsion prior to
4 using said emulsion as fuel.

- 1 **4.** The method of claim 1, further comprising supplying said
2 hydrocarbon fuel and said wastewater into a common
3 container and then performing said emulsifying step by

4 exposing said prepared water and said liquid hydrocarbon
5 fuel to a sound vibration in said common container.

1 5. The method of claim 4, wherein said step of exposing is
2 performed by introducing said liquid hydrocarbon fuel and
3 said prepared water into said common container directly in
4 front of an ultra-sound vibrator.

1 6. The method of claim 5, further comprising feeding variable
2 quantities of said prepared water and said hydrocarbon
3 fuels into said common container.

1 7. The method of claim 1, wherein said step of emulsifying is
2 performed continuously.

1 8. The method of claim 1, further comprising monitoring said
2 emulsifying step for providing information regarding said
3 emulsion and using said information for controlling process
4 steps for producing said emulsion.

1 9. The method of claim 1, further comprising starting said
2 high temperature fuel cell with CH₄ (methane, natural gas)
3 as fuel until an operating temperature of said fuel cell
4 has been reached, and then switching over said fuel cell to
5 receive said emulsion as its fuel.

- 1 . 10. The method of claim 9, further comprising performing said
2 switching over continuously in an overlapping and stepless
3 manner, whereby emulsion and CH₄ are used together as fuel.
- 1 11. The method of claim 1, further comprising the step of
2 dosing said prepared water and said hydrocarbon fuel
3 through positive feed dosing pumps which do not permit any
4 backflow.
- 1 12. The method of claim 11, further comprising electronically
2 controlling said positive-feed dosing pumps in a closed
3 loop manner in response to performance parameters of the
4 high temperature fuel cell or in response to emulsion
5 quality parameters.
- 1 13. The method of claim 12, further including in said
2 electronically controlling step a switch-off function for
3 shutting down the supply of hydrocarbon fuel in response to
4 an emergency.
- 1 14. The method of claim 2, wherein said cracking step is
2 performed inside a separate housing which is positioned
3 inside an enclosure of said high temperature fuel cell.
- 1 15. The method of claim 14, further comprising using thermal
2 energy of said high temperature fuel cell for performing
3 said cracking step.

1 . 16. The method of claim 3, further comprising performing said
2 step of catalytically withdrawing sulfur and sulfur
3 compounds including hydrogen sulfide in a separate housing
4 which is positioned inside an enclosure of said high
5 temperature fuel cell.

1 17. The method of claim 16, further comprising using thermal
2 energy of said high temperature fuel cell for performing
3 said withdrawing step for desulfurizing said emulsion.

1 18. The method of claim 3, further comprising performing said
2 step of catalytically withdrawing sulfur and sulfur
3 compounds including hydrogen sulfide, by chemically binding
4 said sulfur and sulfur compounds including hydrogen sulfide
5 to form stable compounds and avoiding discharging said
6 stable compounds into the atmosphere.

1 19. The method of claim 1, further comprising performing,
2 directly following said emulsifying step, an
3 electrochemical process for cracking or separating
4 molecular bindings of organic compounds of said emulsion.

1 20. The method of claim 19, wherein said electrochemical
2 process is performed by passing said emulsion through an
3 electric gap to subject said emulsion to a gap-electrolysis
4 process.

1 . 21. The method of claim 20, further comprising forming said
2 electric gap between two electrically conducting
3 cylindrical members arranged concentrically one within the
4 other, connecting one cylindrical member to a positive pole
5 of a d.c. power source and connecting the other cylindrical
6 member to a negative pole of said d.c. power source.

1 22. The method of claim 21, comprising using two pipes as said
2 electrically conducting cylindrical members, arranging said
3 two pipes concentrically to each other, and connecting said
4 two pipes to said high temperature fuel cell as said d.c.
5 power source.

1 23. The method of claim 20, further comprising measuring an
2 electrical conductivity of said emulsion and then
3 performing said gap-electrolysis when said electrical
4 conductivity of said emulsion is at least 600 μ S.

1 24. The method of claim 21, wherein said d.c. power source
2 provides a voltage of about 10 volts for starting said
3 cracking of said molecular bindings of said organic
4 compounds of said emulsion.

1 25. The method of claim 1, further comprising using kerosene as
2 said liquid hydrocarbon fuel.